

Serial No. 10/796,302  
Docket No. PTGF-04009  
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### REMARKS

Entry of this Amendment is proper because it does not raise any new issues requiring further search by the Examiner, narrows the issues on appeal, and is believed to place the present application in condition for immediate allowance.

Claims 1-6 and 13-19 are all the claims presently pending in the application.

Claims 7-12 stand canceled without prejudice or disclaimer.

Applicant gratefully acknowledges that **claim 3** is allowed, and that **claim 17** would be allowable if rewritten in independent form. However, Applicant respectfully submits that all of the claims (i.e., claims 1-6 and 13-19) are allowable, for the reasons set forth below.

Applicant notes that claim 13 does not stand rejected on prior art grounds. Therefore, claim 13 also is believed to be patentable if the rejection under 35 U.S.C. § 112, first paragraph, is overcome.

While Applicant believes that all of the claims are patentable over the cited prior art, to expedite prosecution, claim 1 is amended to define more clearly the features of the invention.

New claims 18-19 are added to provide more varied protection for the invention. No new matter is added.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicant specifically states that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

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Claim 13 stands rejected under 35 U.S.C. § 112, first paragraph.

Claims 1, 2, and 14 stand rejected under 35 U.S.C. §102(b) as being anticipated by Yuji (JP 2002-076434).

Claims 4-6, 15, and 16 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Yuji in view of Shinkai (U.S. Patent No. 4,540,915).

These rejections are respectfully traversed in the following discussion.

## I. THE CLAIMED INVENTION

Conventional light emitting devices allow the wavelength conversion of light emitted from a light emitting element by a phosphor material to obtain a desired emission color. In such conventional light emitting devices, the phosphor material in phosphor layer is excited by ultraviolet light emitted from the light emitting element and, thereby, it radiates, e.g., white light.

However, in the conventional light emitting devices the phosphor layer is exposed, and therefore, the phosphor material may be subjected to degradation due to absorbed moisture. On the other hand, if an air-tight housing is employed to prevent the penetration of water into the cover, the manufacturing cost will rise since the light emitting device becomes difficult to assemble. Thus, in conventional devices, it is difficult to sufficiently prevent moisture from causing degradation the phosphor material (e.g., see specification at page 1, lines 15-29, and page 2, lines 1-14).

Also, in the conventional devices, it is difficult to make the thickness of phosphor layer equal. Thus, it is difficult to generate equal fluorescence over the entire cover in conventional devices (e.g., see specification at page 2, lines 15-20).

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The claimed invention, on the other hand, provides a light emitting device in which the degradation of phosphor material due to moisture can be prevented, and equal fluorescence also can be obtained over its entire emission surface (e.g., see specification at page 2, lines 23-28).

According to the claimed invention, the phosphor glass comprises a basic glass component doped with a fluorescence activation element (e.g., see specification at page 6, lines 3-7). It is noted that the present application defines "*phosphor glass*" such that the "*fluorescence activation element*" is included as a glass component (e.g., see page 6, lines 3-4). That is, the "*fluorescence activation element*" is not merely mixed into the glass.

For example, independent claim 1 exemplarily defines a light emitting device, including a light emitting element to emit ultraviolet light, a phosphor layer that includes phosphor glass to generate fluorescence while being excited by the ultraviolet light emitted from the light emitting element, and an optical system to converge the ultraviolet light emitted from the light emitting element. The light emitting element is disposed opposite the optical system.

According to the claimed invention, since the fluorescence activation element is incorporated into the glass structure, it can be stabilized to moisture (e.g., see specification at page 7, lines 11-13). Thus, the claimed invention can provide a light emitting device in which the degradation of phosphor material due to moisture can be prevented, and equal fluorescence also can be obtained over its entire emission surface (e.g., see specification at page 2, lines 23-28).

That is, in a light emitting device according to the exemplary aspects of the claimed invention, ultraviolet light emitted from the light emitting element can excite a phosphor element in the cover to generate fluorescence. According to the exemplarily

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aspects of the claimed invention, the phosphor element can be evenly doped in phosphor glass to form the cover. Thus, the fluorescence can be generated evenly and, therefore, unevenness in emission color can be prevented. Moreover, since the phosphor element is part of the glass material, the phosphor element is prevented from being subjected to degradation due to moisture. Thus, the light emitting device according to the exemplary aspects of the claimed invention can provide excellent endurance (e.g., see specification at page 13, lines 10-18).

## II. REJECTIONS UNDER 35 U.S.C. § 112

Claim 13 stands rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.

Particularly, the Examiner alleges that claim 13 contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. The Examiner alleges that the original disclosure does not provide a support for the device including all of: the phosphor layer (the phosphor glass layer), the optical system and a convex lens, as now recited in claim 13.

Applicant respectfully disagrees, and therefore, traverses this rejection.

It is noted that Applicant shows possession of the claimed invention by describing the claimed invention with all of its limitations using such descriptive means as words, structures, figures, diagrams, and formulas that fully set forth the claimed invention (e.g., see M.P.E.P. § 2163, *citing* Lockwood v. American Airlines, Inc., 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (fed. Cir. 1997)). Moreover, while there is no *in haec verba*

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requirements, newly added claim limitations must be supported in the specification through express, implicit, or inherent disclosure.

Applicant submits that the specification clearly describes, with reference to Figure

11:

The light emitting device 70 is provided with a convex lens-shaped window 64. Like components are indicated by the same numerals used in FIG. 10.

In the light emitting device 70, ultraviolet light emitted from the light emitting element 10 is converged by the window 64. Therefore, intensive ultraviolet light can be radiated in the optical axis direction. The emission spectrum of light emitting element 10 includes a bit of visible light region, though it mostly belongs to ultraviolet light region. Therefore, the turn-on state of light emitting element 10 can be checked by eyes and, however, it is undesirable to check the turn-on state from a convergence direction along the optical axis. In this embodiment, where the window 64 is composed of phosphor glass, the turn-on state of light emitting element 10 can be checked by observing fluorescence light to be radiated laterally from the window 64 while securing the safety.

(see specification at page 18, lines 5-20; emphasis added Applicant's).

In light of the aforementioned specific examples in the original disclosure, Applicants submit that the present application clearly and particularly describes the claimed invention in sufficient detail such that one skilled in the art could reasonably conclude that the inventor had possession of the claimed invention (e.g., see M.P.E.P. § 2163, citing Moba, B.V., v. Diamond Automation, Inc., 325 F.3d 1306, 1319, 66 USPQ2d 1429, 1438 (Fed. Cir. 2003)).

Thus, Applicants have complied with all of the written description requirements for the claimed invention.

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Moreover, Applicants have specifically identified for the Examiner several examples of the corresponding description in the original specification of the disputed claimed structures, thereby clearly rebutting the Examiner's comments.

Thus, the Examiner respectfully is requested to reconsider and withdraw this rejection. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw this rejection.

### III. THE PRIOR ART REJECTIONS

A. As a preliminary matter, Applicant notes that in the present Office Action, the Examiner states:

1. In view of applicant's amendment of claim 1, it is the Examiner's view that it (claim 1) reads only on Figure 12. Specifically, claim 1 does not read on Figure 11. As to Figure 11, the light emitting device includes element 64 (Window), which is a phosphor layer (a phosphor glass layer). Since Figure 11 does not show an optical system to converge the ultraviolet light emitted from the light emitting element (besides the phosphor glass layer 64, as required by claim 1), it is Examiner's view that Claim 1 does not read on Figure 11.

(see Office Action at page 2, numbered paragraph 1).

Applicant respectfully disagrees.

First, Applicant respectfully submits that the Examiner's statement above improperly limits claim 1 only to Figure 12. However, such a limitation is not recited in the claim or intended by the Applicant. Thus, Applicant respectfully submits that the Examiner should not read limitations from the specification or drawings into the claims.

Second, Applicant notes that Figure 11 clearly discloses an exemplary aspect of claim 1.

For example, as set forth above with respect to the rejection under 35 U.S.C. § 112, first paragraph, Figure 11 clearly discloses that "[t]he light emitting device 70 is

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provided with a convex lens-shaped window 64. ...In the light emitting device 70, ultraviolet light emitted from the light emitting element 10 is converged by the window 64. ... In this embodiment, where the window 64 is composed of phosphor glass, the turn-on state of light emitting element 10 can be checked by observing fluorescence light to be radiated laterally from the window 64 while securing the safety" (see specification at page 18, lines 5-20; emphasis added Applicant's).

Thus, claim 11 also clearly illustrates an exemplary aspect of the invention, as defined by claim 1:

Third, it is noted that claims 13 and 14 further define the features of claim 1, by reciting that "*the optical system comprises a convex lens*" and "*the optical system comprises a reflection mirror*," respectively. Thus, Applicant respectfully submits that it clearly would not be proper to interpret claim 1 in a manner that would conflict with the further limitations of this feature.

**B.** Turning to the prior art rejections, claims 1, 2, and 14 stand rejected under 35 U.S.C. §102(b) as being anticipated by Yuji. Claims 4-6, 15, and 16 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Yuji in view of Shinkai.

As mentioned above, while Applicant believes that all of the claims are patentable over the cited prior art, to expedite prosecution, claim 1 is amended to define more clearly the features of the invention.

As to claims 1 and 14, the Examiner alleges that Yuji discloses the features of the claimed invention at least Figures 21 and 22, including:

a light emitting element (10, 115) to emit ultraviolet light; and a phosphor layer (171, 183) that includes phosphor glass (see Detailed Description, paragraph 0064) to generate fluorescence while being excited by the

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ultraviolet light emitted from the light emitting element (10, 115), and an optical system (reflector 172, 181) to converge the ultraviolet light emitted from the light emitting element.

(see Office Action at page 5, numbered paragraph 7).

Applicant respectfully traverses this rejection, for at least the following reasons.

As recited in amended claim 1, "*the light emitting element is disposed opposite the optical system*" to converge ultraviolet light emitted from the light emitting element.

It is noted that the exemplary light emitting device according to the claimed invention provides an important advantage in that it generates ultraviolet light with a high convergence in the optical axis of the light emitting element. For example, the exemplary device can be suitably used for a dental therapy to use a highly-converged light to be irradiated in a narrow area.

Thus, since the light emitting element is disposed opposite the optical system, the light emitting device according to the claimed invention can emit the ultraviolet light with a high convergence by using fully the convergence power of the optical system.

In addition, since the exemplary device according to the claimed invention can be provided with a phosphor layer to generate fluorescence, and the turn-on state of the device can be checked by the fluorescence from the lateral direction, not from the convergence direction along the optical axis of the light emitting element.

In comparison, Applicant respectfully submits that the Yuji reference fails to teach or suggest the light emitting element disposed opposite the optical system, as recited in claim 1.

For example, in the present Office Action, the Examiner alleges that Yuji discloses an optical system (reflector 172, 181) to converge light emitted from the light emitting element. However, it is noted that reflecting plate 172 of Yuji is not disposed opposite the light



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emitting element (10) (see FIG. 21 of Yuji), and reflecting plate 181 of Yuji is not adapted to converge light emitted from the light emitting element (see FIG. 22 of Yuji).

With respect to FIG. 21 of Yuji, it is noted that the light emitted in obliquely upward directions from the light emitting element (10) must be diffused in various directions to have an illumination width since the light emitting element is disposed at the bottom of reflector 172, not opposite reflecting plate 172, and since reflecting plate 172 is not provided with a shape to converge the emitted light.

With respect to FIG. 22 of Yuji, it is clear from a description of "reflecting plate 181" (see [0065] of Yuji) that reflecting plate 181 is only adapted to reflect the emitted light and not adapted to converge it.

As such, FIGS. 21 and 22 of Yuji do not disclose or suggest an optical system to converge light emitted from the light emitting element. In other words, since the light emitting element of Yuji is not disposed opposite the optical system (172) (e.g., as shown in FIG. 21 of Yuji) or since the optical system (181) of Yuji is not adapted to converge the emitted light (e.g., as shown in FIG. 22 of Yuji), the light emitting device of Yuji cannot emit light with a high convergence.

For the foregoing reasons, Applicant respectfully submits that Yuji does not disclose or suggest at least that "*the light emitting element is disposed opposite the optical system,*" as recited in independent claim 1. Therefore, the Examiner is requested to reconsider and withdraw these rejections and to permit these claims to pass to immediate allowance.

On the other hand, with respect to claim 4, the Examiner acknowledges that Yuji does not disclose the phosphor layer including a transparent material and particles including the phosphor glass dispersed in the transparent material, as claimed by applicant.

However, the Examiner alleges that providing the transparent material phosphor layer with the dispersed phosphor particles in it is known in the art for emitting the light. The

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Examiner cites Shinkai for showing a transparent material and particles including the phosphor glass dispersed (see at least summary of invention) in the transparent material for emitting the light from it upon excitement by the UV from the light emitting element.

Therefore, the Examiner alleges that it would have been obvious to one of ordinary skill in the art to provide Yuji's device including the transparent material and phosphor particles dispersed in, as taught by Shinkai, it for emitting the light upon excitement by the UV.

However, Applicant respectfully submits that there are features of the claimed invention which are not disclosed or suggested by Yuji and Shinkai, either individually or in combination. Therefore, Applicant respectfully traverses each of the rejections, for at least the following reasons.

Contrary to the Examiner's statement above, Shinkai does not disclose or suggest "a transparent material and particles including the phosphor glass dispersed (see at least summary of invention) in the transparent material for emitting the light from it upon excitement by the UV from the light emitting element."

Instead, Shinkai discloses only "phosphor", not "*phosphor glass*" as defined by the present application, and claimed in claim 4.

Particularly, Shinkai discloses that, for forming a "phosphor layer", an aqueous slurry composed of powdered glass material (i.e., not "*phosphor glass*", as claimed), a phosphor (i.e., not "*phosphor glass*", as claimed), and a water-soluble binder is applied on the inner wall of a glass tube to form a coating and then the coating is dried and heated (see Shinkai at column 6, lines 35-39).

In comparison, independent claim 1 recites a light emitting device, including, inter alia, "a phosphor layer that includes phosphor glass to

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*generate fluorescence while being excited by the ultraviolet light emitted from the light emitting element” (emphasis added).*

Claim 4, which depends from claim 1, recites, *inter alia*, “wherein the phosphor layer includes a transparent material and particles including said phosphor glass that are dispersed in the transparent material” (emphasis added).

According to the claimed invention, since the phosphor layer includes phosphor glass, the operator can safely check the turn-on, or turn-off, state of the light emitting device while viewing, in the lateral direction of the device, fluorescence generated by being excited by the ultraviolet light emitted from the light emitting element (e.g., see specification at page 18, lines 3-29).

According to the present invention, the “*phosphor glass*” comprises a basic glass component doped with a fluorescence activation element (e.g., see specification at page 6, lines 3-7). It is noted that the present application defines “*phosphor glass*” such that the “*fluorescence activation element*” is included as a glass component (e.g., see page 6, lines 3-4).

That is, the “*fluorescence activation element*” is not merely mixed into the glass, for example, as in Yuji.

According to the claimed invention, since the fluorescence activation element is incorporated into the glass structure, it can be stabilized to moisture (e.g., see specification at page 7, lines 11-13). Thus, the claimed invention can provide a light emitting device in which the degradation of phosphor material due to moisture can be prevented, and equal fluorescence also can be obtained over its entire emission surface (e.g., see specification at page 2, lines 23-28).

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That is, in a light emitting device according to the exemplary aspects of the claimed invention, ultraviolet light emitted from the light emitting element can excite a phosphor element in the cover to generate fluorescence. According to the exemplary aspects of the claimed invention, the phosphor element can be evenly doped in phosphor glass to form the cover. Thus, the fluorescence can be generated evenly and, therefore, unevenness in emission color can be prevented. Moreover, since the phosphor element is part of the glass material, the phosphor element is prevented from being subjected to degradation due to moisture. Thus, the light emitting device according to the exemplary aspects of the claimed invention can provide excellent endurance (e.g., see specification at page 13, lines 10-18).

Thus, applicant submits that Yuji and Shinkai, either individually or in combination, do not disclose or suggest at least that "the phosphor layer includes a transparent material and particles including said phosphor glass that are dispersed in the transparent material", as recited in claim 4.

For the foregoing reasons, Applicant submits that all of the features of claims 1, 2, 4-6, and 14-16 are not disclosed or suggested by Yuji and Shinkai, either individually or in combination.

Therefore, the Examiner is requested to reconsider and withdraw these rejections and to permit these claims to pass to immediate allowance.

#### V. FORMAL MATTERS

The drawings are objected to under 37 C.F.R. § 1.83(a).

Particularly, the Examiner alleges that "the light emitting device including all of:  
(1) a phosphor layer, an optical system including a convex lens (as recited in claim 13);

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and (2) a phosphor layer including plural layers, and an optical system (as recited in claim 17) must be shown or the feature(s) canceled from the claim(s)" (see Office Action at page 2, numbered paragraph 2).

Applicant respectfully submits, however, that the Examiner's reason for this objection is not understood.

With respect to claim 13, Applicant respectfully submits that the features of claim 13 clearly are illustrated at least in Figure 11, and clearly described in the specification with reference to Figure 11 (see specification at page 18, lines 5-20; emphasis added Applicant's).

With respect to allowable claim 17, Applicant respectfully submits that the features of allowable claim 17 clearly are exemplarily illustrated in Figure 5, and described in the specification at page 14, lines 2-15.

For the foregoing reasons, Applicant submits that all of the features of claims 13 and allowable claim 17 clearly are shown in the drawings. Thus, the Examiner is requested to withdraw this objection.

## VI. CONCLUSION

New claims 18 and 19 are added to provide more varied protection for the present invention, as described in the original specification (e.g., see page 18, lines 3-29).

Claims 18 and 19 are patentable over the prior art of record for somewhat similar reasons as those set forth above, as well as for the additional features recited therein.

Therefore, the Examiner is requested to permit claims 18 and 19 to pass to immediate allowance.

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**FEB 12 2007****VII. CONCLUSION**

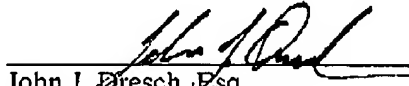
In view of the foregoing, Applicants submit that claims 1-6 and 13-19, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: February 12, 2007

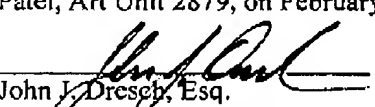
  
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**CERTIFICATE OF TRANSMISSION**

I certify that I transmitted via facsimile to (571) 273-8300 the enclosed Amendment under 37 C.F.R. § 1.116 to Examiner Ashok Patel, Art Unit 2879, on February 12, 2007.

  
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